

# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK



4353

Accredited to  
ISO/IEC 17025:2017

### Alpha Electronics (Southern) Ltd

Issue No: 022

Issue date: 22 November 2021

Unit 6  
Spectrum Business Estate  
Bircholt Road  
Parkwood  
Maidstone  
Kent  
ME15 9YP

Contact: Mr J Puttock  
Tel: +44 (0)1622 690187  
Fax: +44 (0)1622 678827  
E-Mail: john.puttock@alpha-electronics.com  
Website: www.alpha-electronics.com

Calibration performed at the above address only

#### Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks
<b>ELECTRICAL</b>			Unless annotated otherwise electrical measurements are made by direct comparison with reference standards.
DC Voltage			
Generation	0 V to 200 mV 200 mV to 330 mV 330 mV to 1 V 1 V to 2. V 2 V to 3.3 V 3.3 V to 10 V 10 V to 20 V 20 V to 33 V 33 V to 100 V 100 V to 200 V 200 V to 330 V 330 V to 500 V 500 V to 1020 V	69 $\mu$ V/V + 4.0 $\mu$ V 69 $\mu$ V/V + 5.0 $\mu$ V 58 $\mu$ V/V + 9.0 $\mu$ V 58 $\mu$ V/V + 13 $\mu$ V 58 $\mu$ V/V + 16 $\mu$ V 58 $\mu$ V/V + 91 $\mu$ V 58 $\mu$ V/V + 140 $\mu$ V 58 $\mu$ V/V + 190 $\mu$ V 64 $\mu$ V/V + 1.0 mV 64 $\mu$ V/V + 2.0 mV 64 $\mu$ V/V + 3.0 mV 64 $\mu$ V/V + 5.0 mV 64 $\mu$ V/V + 8.0 mV	Values can be generated for the calibration of measuring instruments
Measurement	1 kV to 15 kV 0 V to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1 kV 1 kV to 15 kV	0.30 % + 2.9 V 5.2 $\mu$ V/V + 0.13 $\mu$ V 3.2 $\mu$ V/V + 0.47 $\mu$ V 3.2 $\mu$ V/V + 4.8 $\mu$ V 4.7 $\mu$ V/V + 48 $\mu$ V 4.8 $\mu$ V/V + 0.48 mV 0.30 % + 2.9 V	Outputs of instruments can be measured to the stated uncertainties



4353  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Alpha Electronics (Southern) Ltd**  
Issue No: 022 Issue date: 22 November 2021

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks
DC Current			
Generation	0 $\mu$ A to 200 $\mu$ A 200 $\mu$ A to 330 $\mu$ A 0.33 mA to 1 mA 1 mA to 2 mA 2 mA to 3.3 mA 3.3 mA to 10 mA 10 mA to 20 mA 20 mA to 33 mA 33 mA to 100 mA 100 mA to 200 mA 200 mA to 330 mA 0.33 A to 1 A 1 A to 2 A 2 A to 3.3 A 3.3 A to 10 A 10 A to 20 A	0.018 % + 250 nA 0.018 % + 26 nA 0.012 % + 63 nA 0.012 % + 76 nA 0.012 % + 95 nA 0.012 % + 390 nA 0.012 % + 580 nA 0.012 % + 810 nA 0.012 % + 4.0 $\mu$ A 0.012 % + 6.0 $\mu$ A 0.012 % + 8.0 $\mu$ A 0.044 % + 71 $\mu$ A 0.044 % + 120 $\mu$ A 0.044 % + 250 $\mu$ A 0.070 % + 1.0 mA 0.12 % + 3.0 mA	Values can be generated for the calibration of measuring instruments
	20 A to 30 A 30 A to 100 A	0.035 % + 4.5 mA 0.095 % + 25 mA	
Generation	30 A to 500 A 500 A to 1000 A 1000 A to 1500 A	0.050 % + 0.50 A 0.050 % + 0.60 A 0.050 % + 1.5 A	For the calibration of clampmeters only
Measurement	0 A to 10 nA	0.58 % + 150 pA	Outputs of instruments can be measured to the stated uncertainties
	10 nA to 100 nA 100 nA to 1 $\mu$ A 1 $\mu$ A to 10 $\mu$ A 10 $\mu$ A to 100 $\mu$ A	0.21 % + 150 pA 0.023 % + 150 pA 0.035 % + 230 pA 8.0 $\mu$ A/A + 900 pA	
	100 $\mu$ A to 200 $\mu$ A 200 $\mu$ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 20 A	11 $\mu$ A/A + 460 pA 11 $\mu$ A/A + 4.7 nA 11 $\mu$ A/A + 47 nA 39 $\mu$ A/A + 1.0 $\mu$ A 0.020 % + 19 $\mu$ A 0.045 % + 47 $\mu$ A	
	20 A to 30 A	0.057 % + 6.0 mA	



4353  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Alpha Electronics (Southern) Ltd**  
Issue No: 022 Issue date: 22 November 2021

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	
DC Resistance				
Sourcing				
Specific Values	100 $\mu\Omega$	60 $\mu\Omega/\Omega$	Shunts	
	500 $\mu\Omega$	60 $\mu\Omega/\Omega$		
	1 m $\Omega$	60 $\mu\Omega/\Omega$	Standard Resistors	
	2 m $\Omega$	60 $\mu\Omega/\Omega$		
	4 m $\Omega$	60 $\mu\Omega/\Omega$		
	0.01 $\Omega$	0.90 $\mu\Omega$		
	0.1 $\Omega$	0.80 $\mu\Omega$		
	1 $\Omega$	2.8 $\mu\Omega$		
	10 $\Omega$	26 $\mu\Omega$		
	100 $\Omega$	270 $\mu\Omega$		
	1 k $\Omega$	2.8 m $\Omega$		
	10 k $\Omega$	32 m $\Omega$		
	100 k $\Omega$	310 m $\Omega$		
	1 M $\Omega$	31 $\Omega$		
	10 M $\Omega$	410 $\Omega$		
	100 M $\Omega$	54 k $\Omega$		
	1 G $\Omega$	3.0 M $\Omega$		
	400 $\mu\Omega$	1.5 $\mu\Omega$		For the calibration of low resistance ohmmeters up to 10 A
	4 m $\Omega$	10 $\mu\Omega$		
	40 m $\Omega$	11 $\mu\Omega$		
	400 m $\Omega$	100 $\mu\Omega$		
	4 $\Omega$	1.2 m $\Omega$		
	40 $\Omega$	10 m $\Omega$		
	400 $\Omega$	95 m $\Omega$		
	4 k $\Omega$	250 m $\Omega$		
	40 k $\Omega$	10 $\Omega$		
	400 k $\Omega$	95 $\Omega$		
Sourcing & Measurement	0 $\Omega$ to 2 $\Omega$	12 $\mu\Omega/\Omega$ + 4.7 $\mu\Omega$		
Other Values	2 $\Omega$ to 20 $\Omega$	8.8 $\mu\Omega/\Omega$ + 17 $\mu\Omega$		
	20 $\Omega$ to 200 $\Omega$	8.7 $\mu\Omega/\Omega$ + 58 $\mu\Omega$		
	200 $\Omega$ to 2 k $\Omega$	9.1 $\mu\Omega/\Omega$ + 610 $\mu\Omega$		
	2 k $\Omega$ to 20 k $\Omega$	9.1 $\mu\Omega/\Omega$ + 6.2 m $\Omega$		
	20 k $\Omega$ to 200 k $\Omega$	8.6 $\mu\Omega/\Omega$ + 59 m $\Omega$		
	200 k $\Omega$ to 2 M $\Omega$	11 $\mu\Omega/\Omega$ + 1.2 $\Omega$		
	2 M $\Omega$ to 20 M $\Omega$	18 $\mu\Omega/\Omega$ + 120 $\Omega$		



4353  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Alpha Electronics (Southern) Ltd**  
Issue No: 022 Issue date: 22 November 2021

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks
Other Values Sourcing & Measurement	10 M $\Omega$ to 100 M $\Omega$ 100 M $\Omega$ to 1 G $\Omega$ 1 G $\Omega$ to 10 G $\Omega$ 10 G $\Omega$ to 100 G $\Omega$ 100 G $\Omega$ to 1 T $\Omega$	0.082 % 0.15 % 0.30 % 0.65 % 0.70 %	For the measurement of insulation testers up to 5 kV
AC Voltage Generation	10 mV to 33 mV 10 Hz to 45 Hz 45 Hz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 500 kHz  33 mV to 330 mV 10 Hz to 45 Hz 45 Hz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 500 kHz  330 mV to 3.3 V 10 Hz to 45 Hz 45 Hz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 500 kHz  3.3 V to 33 V 10 Hz to 45 Hz 45 Hz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz  33 V to 330 V 45 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz  330 V to 1020 V 45 Hz to 1 kHz 1 kHz to 10 kHz  50 Hz 1 kV to 15 kV	0.17 % + 23 $\mu$ V 0.12 % + 23 $\mu$ V 0.17 % + 23 $\mu$ V 0.23 % + 23 $\mu$ V 0.40 % + 38 $\mu$ V 1.16 % + 69 $\mu$ V  0.060 % + 25 $\mu$ V 0.030 % + 25 $\mu$ V 0.080 % + 25 $\mu$ V 0.12 % + 47 $\mu$ V 0.27 % + 200 $\mu$ V 0.58 % + 390 $\mu$ V  0.060 % + 110 $\mu$ V 0.030 % + 110 $\mu$ V 0.080 % + 110 $\mu$ V 0.12 % + 110 $\mu$ V 0.27 % + 250 $\mu$ V 0.58 % + 1.10 mV  0.060 % + 1.6 mV 0.030 % + 1.1 mV 0.080 % + 1.1 mV 0.12 % + 1.1 mV 0.27 % + 2.5 mV  0.060 % + 9.0 mV 0.10 % + 14 mV 0.14 % + 14 mV 0.28 % + 93 mV  0.060 % + 38 mV 0.10 % + 38 mV  0.75 % + 9.2 V	Values can be generated for the calibration of measuring instruments



4353  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Alpha Electronics (Southern) Ltd**  
Issue No: 022 Issue date: 22 November 2021

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks
Measurement	<p><i>10 Hz to 40 Hz</i> 0 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1 kV</p> <p><i>40 Hz to 100 Hz</i> 0 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1 kV</p> <p><i>200 Hz to 2 kHz</i> 0 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 100 V to 1 kV</p> <p><i>2 kHz to 10 kHz</i> 0 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1 kV</p> <p><i>10 kHz to 30 kHz</i> 0 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1 kV</p> <p><i>30 kHz to 100 kHz</i> 0 mV to 200 mV 200 mV to 2 V 1 V to 10 V</p> <p><i>100 kHz to 300 kHz</i> 200 mV to 2 V 2 V to 20 V</p> <p><i>300 kHz to 1 MHz</i> 200 mV to 2 V 2 V to 20 V</p> <p><i>50 Hz</i> 1 kV to 15 kV</p>	<p>0.015 % + 4.7 <math>\mu</math>V 0.012 % + 140 <math>\mu</math>V 0.012 % + 0.25 mV 0.012 % + 24 mV 0.029 % + 26 mV</p> <p>0.015 % + 4.7 <math>\mu</math>V 0.010 % + 26 <math>\mu</math>V 0.0090 % + 0.25 mV 0.010 % + 24 mV 0.028 % + 26 mV</p> <p>0.013 % + 2.5 <math>\mu</math>V 0.0080 % + 26 <math>\mu</math>V 0.0080 % + 0.25 mV 0.0080 % + 24 mV 0.028 % + 26 mV</p> <p>0.013 % + 4.7 <math>\mu</math>V 0.010 % + 26 <math>\mu</math>V 0.0090 % + 0.25 mV 0.010 % + 24 mV 0.028 % + 26 mV</p> <p>0.035 % + 9.3 <math>\mu</math>V 0.024 % + 48 <math>\mu</math>V 0.023 % + 0.47 mV 0.023 % + 47 mV 0.14 % + 47 mV</p> <p>0.082 % + 12 <math>\mu</math>V 0.058 % + 0.24 mV 0.058 % + 2.4 mV</p> <p>0.35 % + 2.4 mV 0.35 % + 24 mV</p> <p>1.2 % + 24 mV 1.2 % + 240 mV</p> <p>0.40 % + 60 V</p>	<p>Outputs of instruments can be measured to the stated uncertainties</p>





4353  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Alpha Electronics (Southern) Ltd**  
Issue No: 022 Issue date: 22 November 2021

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks
Measurement	<i>10 Hz to 1 kHz</i> 0 $\mu$ A to 200 $\mu$ A 200 $\mu$ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 20 A 20 A to 30 A  <i>1 kHz to 10 kHz</i> 0 $\mu$ A to 200 $\mu$ A 200 $\mu$ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 20 A	0.030 % + 23 nA 0.030 % + 240 nA 0.029 % + 2.3 $\mu$ A 0.030 % + 23 $\mu$ A 0.070 % + 240 $\mu$ A 0.093 % + 2.3 mA 0.090 % + 20 mA  0.049 % + 23 nA 0.031 % + 240 nA 0.029 % + 2.3 $\mu$ A 0.029 % + 23 $\mu$ A 0.083 % + 240 $\mu$ A 0.29 % + 2.3 mA	Outputs of instruments can be measured to the stated uncertainties
AC Power Generation	<i>40 Hz to 400 Hz</i> 3 W to 40 W 40 W to 4 kW 4 kW to 20 kW  <i>50 Hz to 60 Hz</i> 20 kW to 100 kW 100 kW to 1 MW	0.20 % 0.10 % 0.10 %  0.40 % 0.40 %	At unity power factor  Values can be generated for the calibration of measuring instruments
Capacitance Sourcing	<i>1 kHz</i> 10 pF to 900 pF 900 pF to 9 nF 9 nF to 90 nF 90 nF to 900 nF 900 nF to 9 $\mu$ F 9 $\mu$ F to 90 $\mu$ F	0.10 % + 1.2 pF 0.10 % + 1.2 pF 0.10 % + 12 pF 0.10 % + 22 pF 0.20 % + 270 pF 0.40 % + 2.0 nF	
Measurement	<i>1 kHz</i> 10 pF to 100 pF 100 pF to 1 nF 1 nF to 10 nF 10 nF to 100 nF 100 nF to 1 $\mu$ F 1 $\mu$ F to 10 $\mu$ F 10 $\mu$ F to 100 $\mu$ F	0.12 % + 0.04 pF 0.12 % + 0.05 pF 0.12 % + 0.44 pF 0.12 % + 2.5 pF 0.12 % + 25 pF 0.15 % + 300 pF 0.32 % + 2.0 nF	Outputs of instruments can be measured to the stated uncertainties
Inductance Sourcing	<i>1 kHz</i> 1 mH 10 mH 20 mH 30 mH 50 mH 100 mH 1 H	8.0 $\mu$ H 67 $\mu$ H 130 $\mu$ H 190 $\mu$ H 320 $\mu$ H 650 $\mu$ H 6.5 mH	Values can be sourced for the calibration of measuring instruments



4353  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Alpha Electronics (Southern) Ltd**  
Issue No: 022 Issue date: 22 November 2021

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks
Measurement	1 kHz 1 $\mu$ H to 10 $\mu$ H 10 $\mu$ H to 100 $\mu$ H 100 $\mu$ H to 1mH 1 mH to 10 mH 10 mH to 100 mH 100 mH to 1 H 1 H to 10 H	0.14 % + 40 nH 0.12 % + 30 nH 0.12 % + 200 nH 0.12 % + 230 nH 0.12 % + 14 $\mu$ H 0.12 % + 170 $\mu$ H 0.23 % + 1.9 mH	Outputs of instruments can be measured to the stated uncertainties
AC Resistance	1 kHz 1 $\Omega$ to 10 $\Omega$ 10 $\Omega$ to 100 $\Omega$ 100 $\Omega$ to 1 k $\Omega$ 1 k $\Omega$ to 10 k $\Omega$	0.050 % + 0.7 m $\Omega$ 0.050 % + 5 m $\Omega$ 0.050 % + 45 m $\Omega$ 0.050 % + 0.63 $\Omega$	
Frequency	10 Hz to 3 GHz 10 s to 1 $\mu$ s	0.044 $\mu$ Hz/Hz 1.0 $\mu$ s/s	
Phase Angle	50 Hz 0° to 360°	0.62°	
Optical Tachometers	60 rpm to 60000 rpm	0.0060 % + 0.70 rpm	
IEE 16 <sup>TH</sup> /17 <sup>TH</sup> /18 <sup>TH</sup> EDITION TEST EQUIPMENT			
Insulation Resistance Up to 1 kV	10 k $\Omega$ to 20 k $\Omega$ 20 k $\Omega$ to 40 k $\Omega$ 40 k $\Omega$ to 80 k $\Omega$ 80 k $\Omega$ to 100 k $\Omega$ 100 k $\Omega$ to 200 k $\Omega$ 200 k $\Omega$ to 400 k $\Omega$ 400 k $\Omega$ to 800 k $\Omega$ 800 $\Omega$ to 1 M $\Omega$ 1 M $\Omega$ to 2 M $\Omega$ 2 M $\Omega$ to 4 M $\Omega$ 4 M $\Omega$ to 8 M $\Omega$ 8 M $\Omega$ to 10 M $\Omega$ 10 M $\Omega$ to 20 M $\Omega$ 20 M $\Omega$ to 40 M $\Omega$ 40 M $\Omega$ to 80 M $\Omega$ 80 M $\Omega$ to 100 M $\Omega$ 100 M $\Omega$ to 200 M $\Omega$ 200 M $\Omega$ to 400 M $\Omega$ 400 M $\Omega$ to 800 M $\Omega$ 800 M $\Omega$ to 1 G $\Omega$ 1 G $\Omega$ to 2 G $\Omega$ 2 G $\Omega$ to 4 G $\Omega$ 4 G $\Omega$ to 8 G $\Omega$ 8 G $\Omega$ to 10 G $\Omega$ 100 G $\Omega$ 1 T $\Omega$	0.23 % + 0.51 $\Omega$ 0.23 % + 0.69 $\Omega$ 0.23 % + 1.1 $\Omega$ 0.35 % + 2.3 $\Omega$ 0.58 % + 5.0 $\Omega$ 0.23 % + 7.5 $\Omega$ 0.23 % + 12 $\Omega$ 0.23 % + 19 $\Omega$ 0.23 % + 140 $\Omega$ 0.35 % + 170 $\Omega$ 0.35 % + 240 $\Omega$ 0.35 % + 0.32 k $\Omega$ 0.58 % + 16 k $\Omega$ 0.58 % + 35 k $\Omega$ 0.58 % + 78 k $\Omega$ 0.58 % + 0.20 M $\Omega$ 0.58 % + 4.2 M $\Omega$ 0.58 % + 7.4 M $\Omega$ 1.2 % + 6.5 M $\Omega$ 1.2 % + 9.0 M $\Omega$ 1.2 % + 18 M $\Omega$ 1.2 % + 36 M $\Omega$ 1.2 % + 45 M $\Omega$ 1.2 % + 95 M $\Omega$ 3.5 % + 100 M $\Omega$ 3.5 % + 300 M $\Omega$	





4353  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Alpha Electronics (Southern) Ltd**  
Issue No: 022 Issue date: 22 November 2021

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks
Insulation Resistance DC Voltage	0 V to 1.5 kV (Pk)	1.2 % + 2.3 V	Actual values depend on the value of the local loop resistance
Insulation Test Voltage DC Voltage	50 V to 1.5 kV (Pk)	1.2 % + 2.3 V	
Insulation Test Current DC Current	0 mA to 9.9 mA	0.20 %	
Continuity Resistance	100 mΩ to 100 Ω	0.35 % + 12 mΩ	
	100 Ω to 1 kΩ	0.23 % + 23 mΩ	
	1 kΩ to 2 kΩ	0.23 % + 70 mΩ	
	2 kΩ to 4 kΩ	0.23 % + 100 mΩ	
	4 kΩ to 8 kΩ	0.23 % + 170 mΩ	
	8 kΩ to 10 kΩ	0.23 % + 200 mΩ	
Continuity Current DC Current	0 mA to 320 mA	1.5 % + 0.81 mA	
Loop Resistance	50 Hz		
	25 mΩ	6.7 mΩ	
	50 mΩ	6.7 mΩ	
	110 mΩ	6.7 mΩ	
	310 mΩ	8.8 mΩ	
	500 mΩ	9.8 mΩ	
	1 Ω	12 mΩ	
	1.8 Ω	21 mΩ	
	5 Ω	41 mΩ	
	10 Ω	70 mΩ	
	18 Ω	21 mΩ	
	50 Ω	41 mΩ	
	100 Ω	70 mΩ	
180 Ω	120 mΩ		
500 Ω	3.3 Ω		
1 kΩ	6.0 Ω		
1.8 kΩ	12 Ω		
RCD Current	10 mA to 30 mA	1.2 % + 0.01 mA	
	30 mA to 100 mA	1.2 % + 0.11 mA	
	100 mA to 150 mA	1.2 % + 0.05 mA	
	150 mA to 500 mA	1.2 % + 0.17 mA	
	500 mA to 3 A	1.2 % + 0.2 mA	
RCD Trip Times	10 ms – 50 ms	0.020 % + 0.31 ms	
	50 ms – 100 ms	0.020 % + 0.31 ms	
	100 ms – 500 ms	0.020 % + 0.35 ms	
	500 ms – 4.1 s	0.020 % + 0.58 ms	



4353  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Alpha Electronics (Southern) Ltd**  
Issue No: 022 Issue date: 22 November 2021

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks
Ground Bond Resistance (Nominal)	<i>DC to 60 Hz</i>		
	25 mΩ	6.7 mΩ	
	50 mΩ	6.7 mΩ	
	110 mΩ	6.7 mΩ	
	310 mΩ	8.8 mΩ	
	500 mΩ	9.8 mΩ	
	1 Ω	12 mΩ	
	1.8 Ω	21 mΩ	
	5 Ω	41 mΩ	
	1 Ω	70 mΩ	
	1.8 Ω	21 mΩ	
	5 Ω	41 mΩ	
	10 Ω	70 mΩ	
	18 Ω	120 mΩ	
	50 Ω	350 mΩ	
	100 Ω	580 mΩ	
	180 Ω	2.0 Ω	
	500 Ω	3.4 Ω	
1 kΩ	6.0 Ω		
1.8 kΩ	12 Ω		
Earth Bond Current	<i>DC to 60 Hz</i>		
	50 mA to 400 mA	1.8 % + 3.0 mA	
	400 mA to 3 A	1.8 % + 0.21 A	
	3 A to 10 A	1.8 % + 0.23 A	
	10 A to 20 A	1.8 % + 0.33 A	
20 A to 30 A	1.8 % + 0.84 A		
Earth Leakage	<i>DC to 60 Hz</i>		
	0.1 mA to 30 mA		
	Substitute	0.30 % + 5.0 μA	
	Passive	0.30 % + 5.0 μA	
Differential	0.30 % + 5.0 μA		
Active	0.30 % + 2.0 μA		
Flash Test Voltage	<i>50 Hz to 60 Hz</i> 0 V to 3.5 kV	0.75 % + 9.2 V	
Flash Leakage Current	<i>50 Hz to 60 Hz</i>		
	0 μA to 300 μA	2.0 %	
	300 μA to 3 mA	0.47 %	
3 mA to 30 mA	0.32 %		
DC Voltage	3 V to 30 V	0.37 %	
	30 V to 150 V	0.57 %	
	150 V to 600 V	0.29 %	
AC Voltage	<i>40 Hz to 400 Hz</i>		
	3 V to 30 V	0.37 %	
	30 V to 100 V	0.26 %	
	100 V to 150 V	0.57 %	
150 V to 600 V	0.29 %		



4353  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Alpha Electronics (Southern) Ltd**  
Issue No: 022 Issue date: 22 November 2021

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks
<b>Temperature indicators, calibration by electrical simulation</b>			
Resistance Thermometer	-200 °C to +850 °C	0.010 °C	All thermocouple uncertainties listed include cold junction compensation
Thermocouple type B	600 °C to 800 °C	0.61 °C	
	800 °C to 1000 °C	0.48 °C	
	1000 °C to 1550 °C	0.42 °C	
	1550 °C to 1820 °C	0.45 °C	
Thermocouple type C	0 °C to 150 °C	0.41 °C	
	150 °C to 650 °C	0.36 °C	
	650 °C to 1000 °C	0.41 °C	
	1000 °C to 1800 °C	0.63 °C	
	1800 °C to 2316 °C	1.03 °C	
<b>Temperature indicators, calibration by electrical simulation (cont'd)</b>			
Thermocouple type E	-250 °C to -100 °C	0.61 °C	
	-100 °C to -25 °C	0.24 °C	
	-25 °C to +350 °C	0.22 °C	
	350 °C to 650 °C	0.24 °C	
	650 °C to 1000 °C	0.28 °C	
Thermocouple type J	-210 °C to -100 °C	0.36 °C	
	-100 °C to -30 °C	0.24 °C	
	-30 °C to +150 °C	0.22 °C	
	150 °C to 760 °C	0.25 °C	
	760 °C to 1200 °C	0.31 °C	
Thermocouple type K	-200 °C to -100 °C	0.41 °C	
	-100 °C to -25 °C	0.26 °C	
	-25 °C to +120 °C	0.24 °C	
	120 °C to 1000 °C	0.34 °C	
	1000 °C to 1372 °C	0.50 °C	
Thermocouple type N	-200 °C to -100 °C	0.49 °C	
	-100 °C to -25 °C	0.30 °C	
	-25 °C to +120 °C	0.27 °C	
	120 °C to 410 °C	0.26 °C	
	410 °C to 1300 °C	0.35 °C	
Thermocouple type R	0 °C to 250 °C	0.75 °C	
	250 °C to 400 °C	0.48 °C	
	400 °C to 1000 °C	0.45 °C	
	1000 °C to 1767 °C	0.52 °C	
Thermocouple type S	0 °C to 250 °C	0.64 °C	
	250 °C to 1000 °C	0.49 °C	
	1000 °C to 1400 °C	0.50 °C	
	1400 °C to 1767 °C	0.60 °C	



4353  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Alpha Electronics (Southern) Ltd**  
Issue No: 022 Issue date: 22 November 2021

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks
Thermocouple type T	-200 °C to -150 °C -150 °C to 0 °C 0 °C to + 120 °C 120 °C to 400 °C	0.74 °C 0.32 °C 0.23 °C 0.21 °C	
<b>TEMPERATURE</b>  Temperature indicators and recorders with sensors	-30 °C to 0 °C 0 °C to 30 °C 30 °C to 140 °C 140 °C to 230 °C 230 °C to 420 °C 420 °C to 650 °C	0.10 °C to 0.070 °C 0.070 °C 0.070 °C to 0.14 °C 0.24 °C to 0.36 °C 0.36 °C to 0.65 °C 0.65 °C to 1.0 °C	Calibration by comparison with Reference PRTs in dry block.
<b>PRESSURE</b>  Gas Pressure (gauge)  Calibration of pressure indicating instruments and gauges	-85 kPa to 0 kPa 0 kPa to 690 kPa 690 kPa to 2 MPa  3.7 kPa to 100 kPa 100 kPa to 700 kPa	56 Pa 0.40 kPa 1.8 kPa  0.034 kPa 0.008 0 % + 0.13 kPa	Methods consistent with EURAMET CG17  Calibration against digital pressure calibrator or controller.  Calibration against deadweight tester  Absolute pressures within these ranges can be generated which will attract the additional absolute pressure uncertainty quoted.
Gas Pressure (absolute)  Calibration of pressure indicating instruments and gauges	55 kPa to 117 kPa	41 Pa	Calibration against digital pressure controller
Hydraulic Pressure (gauge)  Calibration of pressure indicating instruments and gauges	0 kPa to 15 MPa 15 MPa to 70 MPa  0.6 MPa to 6 MPa 6 MPa to 30 MPa 30 MPa to 70 MPa	3.0 kPa 8.2 kPa to 8.7 kPa  0.34 kPa 6.7 kPa 6.7 kPa	Calibration against digital pressure controller.  Calibration against deadweight tester  Absolute pressures within these ranges can be generated which will attract the additional absolute pressure uncertainty quoted.
END			



4353  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Alpha Electronics (Southern) Ltd**  
**Issue No: 022 Issue date: 22 November 2021**

Calibration performed at main address only

**Appendix - Calibration and Measurement Capabilities**

**Introduction**

The definitive statement of the accreditation status of a calibration laboratory is the Accreditation Certificate and the associated Schedule of Accreditation. This Schedule of Accreditation is a critical document, as it defines the measurement capabilities, ranges and boundaries of the calibration activities for which the organisation holds accreditation.

**Calibration and Measurement Capabilities (CMCs)**

The capabilities provided by accredited calibration laboratories are described by the Calibration and Measurement Capability (CMC), which expresses the lowest measurement uncertainty that can be achieved during a calibration. If a particular device under calibration itself contributes significantly to the uncertainty (for example, if it has limited resolution or exhibits significant non-repeatability) then the uncertainty quoted on a calibration certificate will be increased to account for such factors.

The CMC is normally used to describe the uncertainty that appears in an accredited calibration laboratory's schedule of accreditation and is the uncertainty for which the laboratory has been accredited using the procedure that was the subject of assessment. The measurement uncertainty is calculated according to the procedures given in the GUM and is normally stated as an expanded uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of  $k = 2$ . An accredited laboratory is not permitted to quote an uncertainty that is smaller than the published measurement uncertainty in certificates issued under its accreditation.

**Expression of CMCs - symbols and units**

It should be noted that the percentage symbol (%) represents the number 0.01. In cases where the measurement uncertainty is stated as a percentage, this is to be interpreted as meaning percentage of the measurand. Thus, for example, a measurement uncertainty of 1.5 % means  $1.5 \times 0.01 \times q$ , where  $q$  is the quantity value.

The notation  $Q[a, b]$  stands for the root-sum-square of the terms between brackets:  $Q[a, b] = [a^2 + b^2]^{1/2}$